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Settlers' Satisfaction with Infrastructure Provision in Molo Kivulini Settlement Schemes, Kenya

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Settlement schemes in Kenya were established to promote agricultural development, redistribute land, and improve settlers' quality of life. Their success depends on adequate infrastructure and services. This paper assessed infrastructure provision and factors influencing its satisfaction in Kivulini settlement schemes in Molo Sub-County, Kenya. A mixed method design was adopted, with sampling of 181 households based on stratified random sampling. Data was collected through household questionnaires and analysed using Statistical Package for the Social Sciences version 25. An ordinal regression model was used to determine if demographic characteristics, reliability and availability of infrastructure affect satisfaction. The findings reveal that infrastructure provision in Kivulini settlement schemes was inadequate: essential facilities such as health facilities, markets, and secondary school were lacking, while a primary school, an administration office, and a nursery school were available. The schemes require three primary schools, one secondary school, 4 markets, and 2 health centres. Settlers reported high satisfaction with religious facilities, with a mean of 4.24, and low satisfaction with market and health facilities, with a mean of 2.53 and 2.55, respectively. Ordinal regression results indicate that socioeconomic factors, age, marital status, education level, land tenure, and farming engagement significantly influence satisfaction with infrastructure. Availability of health and religious facilities and the reliability of road infrastructure were significant predictors of overall infrastructure satisfaction. Despite the long-standing role of settlement schemes in rural development, persistent infrastructure deficits continue to undermine their success. Planners and policy makers should go beyond land redistribution to support sustainable rural livelihoods when establishing settlement schemes by ensuring the schemes have adequate infrastructure.

Keywords: Land distribution, settlement schemes, settler satisfaction, infrastructure provision

Introduction

Establishment of Settlement schemes involve complex multi-sectoral planning activities (Stanbury, 1988). The first settlement scheme was the Soldier Settlement Scheme, which was introduced after World War I. This influenced the establishment of settlement schemes in many parts of the world (Abdallah, 2021; Abongo, 2015). Settlement schemes were established in Africa and Asia to promote rural development (Abdallah, 2021; Abongo, 2015; Chambers, 1974; Kinsey, 1999), their formation was driven by humanitarian, economic and political stability (Amerasinghe, 1976). Schemes in many countries were used to distribute land, reduce poverty, accelerate economic growth (Cliffe, 2000; Deininger, 1999; Irangani, 2020). Settlement schemes in Kenya were introduced to redistribute land, reduce landlessness, and promote agricultural development (Boone *et al*., 2021; Cherotich & Letema, 2021). This was promoted through the Marshall Plan and the Swynnerton Plan, which the colonial government formulated. In 1947, the Marshall Plan paved the way for major land reforms in Kenya, including land adjudication and establishment of the settlement schemes in the former White Highlands (Wayumba, 2019).

The Kenyan government established settlement schemes in different parts of the country after independence to improve the socioeconomic status of rural population, redistribute land owned by colonial settlers, promote ethnic integration, and ultimately serve as nuclei for rural towns between 1969 and 1980 (Abongo, 2015; Kinuthia *et al*., 2021; Lukalo & Odari, 2016). The creation of smallholder settlement schemes and the restructuring of older ones have remained central pillars of the Kenyan government's efforts to address issues of landlessness and inequality in landholding, and to build political alliances in post-independence Kenya (Boone *et al*., 2023).

Two types of schemes were established: conventional and squatter schemes. A conventional scheme was one in which land was set aside and declared a settlement scheme area, while a squatter scheme was for people who had no tenured land of their own and were resettled on designated parcels of land (Lukalo & Odari, 2016). Settlers in the squatter schemes generally are allocated smaller plots than conventional plots because they are not intended to be revenue-generating (NLC, 2019).

Access to adequate infrastructure is vital to enhance sustainable rural development and promote Sustainable

Development Goals (SDGs) 3, 4, 6, and 9 (Chipenda, 2025). Hence, infrastructure provision is essential for the success of settlement schemes, including roads, water supply, sanitation, electricity, schools, and health facilities (AUC, 2019). Infrastructure in settlement schemes can be classified into three main types: physical infrastructure (roads, water, and electricity), social infrastructure (health and educational facilities, community centres, fire and security services), and institutional infrastructure (agricultural research facilities and credit and financial institutions) (Abongo, 2015). Infrastructure development in settlement schemes is an essential driver of socioeconomic wellbeing. It facilitates access to critical services, enhances productivity, and fosters social inclusion (Abongo, 2015; RoK, 2019; UNHCR, 2019).

Initially, the schemes were planned to be self-sufficient in terms of infrastructure and basic social amenities (Abongo, 2015), but urbanization and population growth have caused the provision of infrastructure within and across settlement schemes to be uneven (Lukalo *et al.*, 2019). This has been exacerbated by a decline in government support for infrastructure and services, creating additional challenges (Boone *et al*., 2023). Therefore, the establishment of settlement schemes requires the provision of essential infrastructure and services crucial to the viability and productivity of the schemes (Kikuchi *et al*., 2020; Boone *et al*., 2021). This underscores the need for planners to address challenges of infrastructure and facilities provision to match population growth (Mugah *et al*., 2025) yet comprehensive assessments of current status of infrastructure in settlement schemes is limited.

Several studies have examined settlement schemes in relation to land redistribution (Hebinck, 2015; Hoogeveen & Kinsey, 2001; Kinsey & Binswanger, 1993; Potts & Mutambirwa, 1997; Ratten, 1993), land reforms (Cliffe, 2000; Hall, 2004; Hazlewood, 1985; Thomas, 2003) and agricultural development (Moyo *et al.*, 2017; Munyua, 2020; Mutambara & Munodawafa, 2014). Limited research exists on infrastructure provision and settlers' satisfaction in settlement schemes globally. Chipenda (2025) examined social infrastructure provision in Zimbabwe's settlement schemes and found that the schemes still experience persistent challenges in service provision and resource access. Poor infrastructure was identified as one of the major barriers to productivity in the Mkoba and Silalatshani irrigation schemes (Moyo *et al*., 2017). Lack of infrastructure provision was a major cause of deficiencies in infrastructure and services in gecekondus in Turkey (Leitmann & Baharoğlu, 1999). These studies highlight the importance of infrastructure provision in schemes. Abongo (2015) determined that infrastructure development influenced the livelihoods of the settlers in Lake Kenyatta scheme. The provision of infrastructure has been found to positively influence the livelihoods of settlers in Lake Kenyatta and Dawuro (Zeleke, 2010). The study by Abongo used the settlers' perspective to assess infrastructure adequacy, whereas this study uses planning standards as a determinant of adequacy, overcoming Abongo's single-perspective limitation and providing planners with informed decisions on the provision of adequate infrastructure in upcoming schemes in rural areas. This paper addresses the gaps by assessing the current infrastructure provision in Kivulini settlement schemes and determining factors that influence infrastructure satisfaction in Kivulini settlement schemes. The findings provide insight to planners and policy makers in national and county government to ensure that settlement schemes are not only created for redistribution of land but also to enhance rural development and improve the livelihoods of settlers.

Literature Review

Infrastructure is a basic system of facilities, utilities and services that provide for the basic wellbeing and superiority of life. Infrastructures enhances the living condition of the citizens (Idris *et al*., 2020). The sustainability and growth of a community depends on infrastructure (Idris *et al.,* 2020). Hence it is the foundation for economic growth and productivity (Hubaishi & Ali, 2021). Infrastructures can be provided by government or by private regulated entities (Hubaishi & Ali, 2021) to facilitate the effective functioning of the society (Idris *et al.*, 2020).

Infrastructure plays a catalytic role in promoting growth and development, particularly in agriculture (Mazibuko & Anwi, 2019). The absence of adequate infrastructure hinders economic development and efforts to reduce poverty. Lack of infrastructure can delay development in rural areas (Mazibuko & Anwi, 2019). The provision of adequate infrastructure, such as roads, electricity, water, sewage, and drainage, determines an area's socio-economic well-being (Ogunbajo *et al*., 2016). Sulyman (2014) also supports this by stating that equitable and adequate distribution of infrastructure within rural areas will trigger rural transformation, enhance socio-economic development, and improve the quality of life of residents. Usually, people living in the rural areas lack the necessary attributes and means, which could have been used as catalyst for rural transformation and development (Sulyman, 2014). However, available literature indicate that a great proportion of the rural population still remains deprived (Sulyman, 2014). Although basic infrastructure was found to exists in Nigeria, it was inadequate to effectively support significant development (Sulyman, 2014). Therefore, it is important to assess the adequacy of rural infrastructure

in settlement schemes in Kenya, as infrastructure provision plays a critical role in improving livelihoods and promoting rural development.

The level of availability of public infrastructural facilities provided in accordance to residents' preferences in most developing countries is alarmingly low, even though the quality and coverage of these infrastructural services provision have a major impact on living standards and economic prosperity of people and the problem is escalating (Idris *et al.*, 2020). Availability of rural infrastructure constitutes the substance of rural welfare. Efforts to raise rural welfare must necessarily go beyond the traditional and limited approach of raising per capita income through agricultural development projects to the provision of basic rural needs such as health and medical facilities, electricity, water, and schools (Sulyman, 2014).

Infrastructure can be evaluated in terms of accessibility, safety, reliability, responsiveness and empathy. Accessibility means the presence or availability of infrastructure (Hubaishi & Ali, 2021). Safety refers to the physical condition and safe use of infrastructure. Reliability is the effectiveness of infrastructure maintenance, value for money, and service efficiency (Hubaishi & Ali, 2021). Responsiveness is the speed in rectifying maintenance challenges and meeting the current and future demands (Hubaishi & Ali, 2021). Empathy is the competence and expertise of people responsible for maintaining and resolving problems and complaints related to infrastructure (Hubaishi & Ali, 2021).

Studies regarding residents satisfaction on infrastructure are not common, as only few countries carried out such satisfaction studies (Hubaishi & Ali, 2021). Adebisi and Aremu (2014) assessed rural dwellers' satisfaction with the quality of infrastructure in rural settlements in Niger State, Nigeria. The study found that the quality of infrastructure attributes affects satisfaction with infrastructure (Adebisi & Aremu, 2014). Keffi *et al.* (2024) assessed satisfaction with the provision of infrastructure in Nasarawa State. The study showed that infrastructure satisfaction was affected by limited access, reliability, efficiency and maintenance. Maintenance of public infrastructure such as electricity, water, sanitation, transport, and the value for money of these utilities, makes the consumers satisfied (Hubaishi & Ali, 2021). Demographic characteristics have been found to influence residents' satisfaction levels in Nigeria (Fakere & Duke-Henshaw, 2023) and Malaysia (Mohit & Azim, 2012). Accessibility as well as access are also components of satisfaction on infrastructure (Hubaishi & Ali, 2021). Studies on satisfaction with infrastructure provision show that satisfaction is influenced by several factors such as accessibility, reliability, availability, efficiency, maintenance, and service quality. This highlights the need to assess satisfaction with infrastructure in settlement schemes.

Research Methodology

The study was conducted in Kivulini settlement schemes in Molo Sub-County, Nakuru County. Molo has the highest number of schemes in Kenya (Lukalo & Odari, 2016), hence the need to conduct a study in one of the settlement schemes established there. Kivulini settlement schemes are conventional, since land was set aside and declared a scheme**.** The study adopted a mixed methods design to capture both quantitative and qualitative data. Mixed methods help in obtaining findings from the research compared to the single dataset method (Creswell & Clark, 2017). This design is appropriate for household studies measuring service provision and satisfaction as used in other studies (Akindele *et al*., 2025; Ezebilo & Savadogo, 2021; Maina *et al*., 2025). Kivulini and Kivulini Extension Settlement schemes, have a total of 256 and 97 surveyed plots respectively, with 10 plots set aside in Kivulini and 4 plots in Kivulini Extension as public utility and environmentally fragile areas. Therefore, Kivulini and Kivulini Extension settlement schemes were sampled 131 and 50 households respectively, using the Cochran sampling formula (Cochran, 1977), yielding a response rate of 93%, which ensured fair representation and reduced bias. Primary data was collected using household questionnaires, while secondary data was obtained from the Kenya National Bureau of Statistics (KNBS)**.** Secondary data was used to determine the current population of the schemes**.** The primary data captured information on residents' levels of infrastructure satisfaction, infrastructure availability and reliability, as well as the demographic characteristics of settlers. Open-ended questions were used to probe satisfaction level, reliability, and infrastructure availability.

Formal employment was defined as working in a registered company/organization with a formal employment contract and a regular salary. Informal employment entails working in an unregistered business or enterprise that operates without a formal business permit or license; such as small-scale trading, hawking or casual labourer. Farming entails people who cultivate crops and rear livestock. Business is a registered enterprise operating under a formal business permit and business license. This categorization of employment was adopted from economic survey (KNBS, 2023).

Infrastructure satisfaction was measured using a five-point Likert scale**,** where 1 = Very Dissatisfied and 5 = Very Satisfied**.** Infrastructure availability was measured using a dichotomous scale**,** where 0 = Not Available and 1 = Available**.** Infrastructure reliability was measured using a binary scale, where 1 = Reliable

and 0 = Not Reliable**.** Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 25**,** and results were presented as percentages and means. Adequacy of facilities was assessed using the population catchment stipulated in the Physical and Land Use Planning Handbook (RoK, 2025). Adequate amenities are those with the required number of facilities to serve the settler population. An ordinal regression model was used to assess the impact of demographic characteristics, infrastructure availability, and infrastructure reliability on overall satisfaction with infrastructure. These variables have been found to affect satisfaction in other studies, as shown in Table 1. Ordinal regression was used since the dependent variable was ordinal. Ordinal regression is appropriate technique due to the ordinal nature of the dependent variables representing satisfaction (Lu, 1999) and has been used in satisfaction studies *(Buys & Miller, 2012; Zhang et al*., 2023). Demographic characteristics, infrastructure availability, and infrastructure reliability were independent variables, while infrastructure satisfaction was the dependent variable. The model was tested for fitness using the chi-square test**,** which was significant ($p < 0.05$). Variables with p-values < 0.05 were statistically significant. This value was adopted is consistent with research studies on satisfaction. All the models were significant at < 0.05. The ordinal regression model's goodness of fit was assessed using pseudo R^2. The first model had Cox & Snell R^2 (0.272) and Nagelkerke R^2 (0.329), indicating the model had acceptable explanatory power. This is consistent with standard thresholds for social science research where value that range between 0.10 and 0.50 are acceptable (Ozili, 2023). The second model had a Cox & Snell R^2 (0.432) and Nagelkerke R^2 (0.520) showing it also had an acceptable explanatory power.

Table 1: Factors that affect infrastructure satisfaction

Variable	Citation
Demographic	(Chelladurai *et al*., 2024; Fakere & Duke-Henshaw, 2023)
Reliability	(Adedayo & Sulyman, 2015; Badri *et al*., 2015; Hubaishi & Ali, 2021; Sabelo *et al*., 2024)
Availability	(Dimuna & Olotuah, 2019; Karim, 2009)

Results and Discussion

Sociodemographic characteristics of Kivulini settlement schemes settlers

Table 2 shows the demographic characteristics of settlers in Kivulini. Majority of the settlers (79.3%) were male, aged between 71-80 years (33.7%) completed primary school (61.5%), and married (74%). The average household size in the scheme is 5, 84% of the settlers have been on these schemes since their inception in 2007, with settlers who have lived in the scheme for less than 5 years are mostly buyers. The primary source of income for the majority of settlers is farming (73.4%), followed by formal employment (13%), informal employment (10.1%), and business (3.6%), indicating that farming is the primary source of livelihood for most settlers.

Table 2: Sociodemographic characteristics of Kivulini settlers

Variables	Categories	Percentage (%)
Gender	Male	79.3
	Female	20.7
Age	Below 30 years	1.2
	31-40 years	14.2%
	41-50years	11.2%
	51-60 years	14.8%
	61-70years	13.6%
	71-80years	33.7%
	Over 80 years	11.2%
Marital status	Single	4.1%
	Married	74.0%
	Widowed	18.9%
	Divorced	3.0%
Education	No school	14.8%
	Primary level	61.5%
	Secondary level	18.9%
	College	4.7%
Average household size	5	
Years lived in scheme	1-5years	1.8%
	5-10 years	14.2%
	10 years and above	84%
Source of income	Business	3.6%
	Farming	73.4%
	Formal employment	13.0%
	Informal employment	10.1%
Practice farming	No	13.7%
	Yes	86.3%

Adequacy of infrastructure provision

Kivulini and Kivulini Extension Settlement Schemes were planned as one entity. Infrastructure were meant to serve both schemes. The assessment of the adequacy of infrastructure facilities is presented in Table 3, which shows that some are adequate, while others are inadequate or lacking. Kivulini settlement schemes have a population of 8,867, which requires about three primary schools, a secondary school, a chief's/police post, two health centres and four market centres based on the population catchments (RoK, 2025) yet it has one primary school and a chief's/police post (Table 3), which makes facilities provision inadequate. Inadequate funds and weak institutional support were key constraints to infrastructure development in Kivulini settlement schemes as highlighted by the settlers from the open-ended questions. Overall, these findings reveal that infrastructure provision within the schemes are inadequate, with some essential social facilities not developed, which may negatively affect facility accessibility and settlers' quality of life. These findings will help policymakers and local (county) authorities gauge the effectiveness of the current provision of infrastructure and services (Mugah *et al*., 2025) when establishing settlement schemes. One of the main reason people move to planned settlement schemes is due to the proximity and availability to a range of facilities (Mugah & Wangai, 2024; Mwangi, 1987), which promotes development of schemes in rural areas and limit migration to major urban areas and cities.

Table 3: Adequacy of facilities in the schemes

Facility	Population catchment (RoK, 2025)	Current number	Number required	Remarks
Primary school	3000	1	3	Inadequate
Secondary school	6000	0	1	Lacking
Chief/police post	5,000	1	1	Adequate
Market/trading centre	2,000	0	4	Lacking
Health centre	5,000	0	2	Lacking

Perception on availability and reliability of infrastructure provision

Table 4 shows the perception of availability and reliability of various infrastructures in Kivulini settlement schemes. Eighty-two percent of the settlers stated that water is available. This shows that the majority of settlers have access to water, but a few still lack it due to unequal distribution of water sources. Data from the household questionnaire indicated that the main water sources in the settlement schemes are borehole, rainwater, river, dam, spring, well and piped water. Ninety-four percent stated chief's office is available. This shows majority of the settlers can access the chief's office. Majority of the settlers stated that schools are available (91.7%). This shows that the settlers have a high perception of the availability of primary schools, as they use the neighbouring schools, even though schools are inadequate as per the planning standards. This perception reflects reliance on cross-neighbouring schools despite the inadequacy in the schemes, as highlighted by Pishgahi and Partovi (2021). The schemes, educational facilities were inadequate, as only one primary school was available against a requirement of three, and no secondary school was present. This indicates that while schools are available in the neighbouring areas, their adequacy within the scheme is still limited. Ninety-four percent of the settlers stated that religious facilities are available, which shows the religious facilities are accessible in the schemes. Thirty-three percent stated dispensaries were available, which shows a lack of health facilities within the scheme. Therefore, these findings show uneven availability of essential facilities in Kivulini settlement schemes, with strong access to administrative facilities but lack of health facility. Accessibility and availability of infrastructure are important for enhancing the quality of life of settlers (Mugah *et al.,* 2025*;* Mugah & Wangai, 2024).

The table also shows the reliability of various infrastructure facilities in the Kivulini settlement schemes. Seventy-one percent of the settlers stated that the water was reliable; hence, the available water meets the settlers' daily needs for farming, washing, cooking, and drinking. The majority of settlers (63.9%) rated the roads as reliable; however, reliability is seasonal as the unpaved roads often become impassable during the rainy season. Poor roads were one of the challenges acknowledged by the settlers based on responses from the open-ended questions. Ninety-seven percent of the settlers reported that the schools were reliable, indicating that most schools met their educational needs. Seventy-four percent of the settlers stated that health facilities were not reliable, which shows that the majority of the settlers were dissatisfied with the health facility due to limited access and the absence of one within the scheme. From the response on open ended questions, they had to travel to Turi or Molo town to access health services. Infrastructure and utilities such as roads and water sources are primary drivers of development (Kinuthia *et al.*, 2022), hence

they should be provided in each scheme. Unreliable infrastructure systems limit the productivity of businesses and public services and costly infrastructure services add to production costs, which undermine business competitiveness (Thacker *et al*., 2019). These gaps can undermine the productivity of a settlement scheme and the well-being of its settlers.

Table 4: Infrastructure availability

Infrastructure	Availability (%)	Reliability (%)
Chief	94.1	-
Water	82.8	71
Roads	91.7	63.9
Schools	95.3	97
Church	94.1	-
Health centre	32.5	26.
Electricity	67	77.4

Table 5 shows the settlers' satisfaction with the infrastructure facilities in the schemes. Residents were delighted with the religious facilities, with a mean of 4.24, followed by schools, electricity, roads, and water, with mean scores of 3.91, 3.61, 3.35, and 3.35, respectively. The settlers were highly satisfied with the religious facilities because they were accessible and many were within the schemes. Several churches exist in these settlement schemes; majority are concentrated within Kivulini trading centre**.** The residents were moderately satisfied with schools, electricity, water, and roads. Piped water in the schemes is sourced by the County Government of Nakuru from the neighbouring Michina farm. Very few households in the schemes have access to piped water; the other households have to get water from rivers, the dam, and boreholes. The availability of potable water is a crucial determinant of settlers' health and, as a result, of their agricultural performance. Electricity connections are concentrated around the trading centre; hence, not all households in the scheme have electricity. All roads in the scheme are unpaved; during the rainy season, most are impassable, disrupting transportation due to muddy conditions. These issues reflect the uneven infrastructure rollout typical of Kenyan settlement schemes, as highlighted by Lukalo *et al*. (2019). The availability and accessibility of infrastructure reduce rural poverty and promote rural development (Manggat *et al*., 2018). The condition of roads determines market accessibility and significantly affects the success or failure of a given settlement scheme. Since the settlement scheme was established to improve the well-being of farmers. Poor roads inhibit their farm production. It is important to develop basic infrastructure in settlement schemes to improve settlers' quality of life. The residents had lower satisfaction with the market and health facilities, with means of 2.53 and 2.55, respectively. This is due to unavailability, which limits accessibility; hence, they have to travel longer distances to access these facilities elsewhere.

Table 5: Infrastructure satisfaction

Infrastructure Satisfaction	Mean	Rank
Market	2.53	7
Health	2.55	6
Water	3.35	5
Roads	3.35	4
Electricity	3.61	3
Schools	3.97	2
Churches	4.24	1

Factors influencing infrastructure satisfaction in Kivulini settlement schemes

Two ordinal regressions were run to test the impact of sociodemographic characteristics, infrastructure availability and infrastructure reliability on overall infrastructure satisfaction. The independent variables were gender, age, marital status, years lived in the settlement, education, land tenure, source of income and practice farming in the first model. Table 6 shows that age, marital status, education level, land tenure, and engagement in farming were significant determinants of satisfaction with infrastructure ($p < 0.05$). Settlers aged 30-40 years, 51-60 years, and 71-80 years were less likely to report higher levels of satisfaction than older settlers (over 80 years), as indicated by negative coefficients. Younger age groups have a higher demand for living conditions than older age groups, thereby contributing to lower infrastructure satisfaction among younger residents (Tang & Feng, 2024). Widowed settlers were less likely to report higher satisfaction compared to divorced settlers. Education level had a significant effect; settlers with no formal education were more likely to report higher facility satisfaction than those with higher education ($p = 0.013$). Less-educated settlers have lower expectations for infrastructure, so they are likely to be

satisfied with the infrastructure provided. This finding aligns with Tang and Feng (2024), who found that higher education levels increase a person's quality-of-life demand, thereby reducing satisfaction with existing infrastructure. Land tenure was another important determinant, with settlers who owned land under freehold ($p = 0.013$) and leasehold ($p = 0.008$) significantly more likely to report higher satisfaction than those who rented. Those who rent the land occupy it for a limited period and are therefore less likely to be affected by the availability and reliability of infrastructure. Settlers who were farmers had lower satisfaction levels due to poor roads that hindered their access to markets for their produce. The strongest predictor of infrastructure satisfaction was age below 30 years, with an odds ratio of 6.6. This indicated that settlers aged below 30 were over 6 times more likely to report higher satisfaction with infrastructure than older settlers.

The independent variables in the second model were the availability and reliability of infrastructure. Table 7 shows that the availability of health and religious facilities, and reliable roads were significant predictors of satisfaction with infrastructure ($p < 0.05$). Availability of a health facility had a significant effect on satisfaction. Settlers were less likely to report higher levels of satisfaction when the schemes lacked a health facility ($\beta = -1.750$, $p < 0.001$). The lack of health facilities within the scheme forces settlers to travel longer distances to access care, which can delay emergency services and increase health risks in critical situations. Access to a healthcare facility is essential for a healthy population (Keffi *et al*., 2024). Similarly, the absence of religious facility significantly reduced satisfaction levels ($\beta = -2.867$, $p = 0.003$). Without a religious facility, settlers were less likely to report higher satisfaction. This variable had a high odds ratio of 2.8. This indicated that without a religious facility, the settlers were 2 times less likely to have high infrastructure satisfaction. Settlers who reported unreliable roads were less likely to report higher satisfaction with infrastructure ($\beta = -1.908$, $p = 0.010$). Unreliable roads reduce satisfaction levels due to mobility constraints, particularly affecting farmers' access to markets. Roads of high quality boost agricultural produce and allow better access to markets and increase farmers' profits because transportation costs are greatly reduced (Suleiman *et al*., 2022).

Table 6: Ordinal regression model for sociodemographic factors for infrastructure satisfaction in Kivulini settlement schemes

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
	Household size	.006	.075	.006	1	.936	-.140	.153
	Gender= Male	-.299	.529	.320	1	.572	-1.335	.738
	Female	0[a]	.	.	0	.	.	.
	[**Age**=Below 30 years]	**-6.675**	2.452	7.413	1	**.006**	-11.480	-1.870
	[31-40 years]	-2.687	1.015	7.011	1	**.008**	-4.676	-.698
	[41-50 years]	-1.492	1.099	1.841	1	.175	-3.647	.663
	[51-60years]	-1.797	.862	4.350	1	**.037**	-3.485	-.108
	[61-70years]	-.399	.881	.205	1	.651	-2.126	1.328
	[71-80yeras]	-1.671	.779	4.598	1	**.032**	-3.199	-.144
	[Over 80years]	0[a]	.	.	0	.	.	.
	[**Marital status**=Single]	-.832	1.892	.193	1	.660	-4.541	2.878
	[Married]	-2.319	1.468	2.496	1	.114	-5.196	.558
	[Widowed]	-3.514	1.526	5.302	1	**.021**	-6.505	-.523
	[Divorced]	0[a]	.	.	0	.	.	.
	[**Education**=No school]	3.251	1.312	6.141	1	**.013**	.680	5.821
	[Primary]	.472	1.050	.202	1	.653	-1.586	2.530
	[Secondary]	.890	1.179	.570	1	.450	-1.420	3.201
	[College]	0[a]	.	.	0	.	.	.
	[**Years lived**=1-5 years]	-.916	1.811	.256	1	.613	-4.466	2.634
	[Years lived=5-10years]	.978	1.546	.400	1	.527	-2.052	4.008
	[Years lived=10-15 years]	1.565	.999	2.451	1	.117	-.394	3.523
	[Years lived=15years and above]	0[a]	.	.	0	.	.	.
	[**Land tenure**=Freehold]	2.219	.890	6.216	1	**.013**	.475	3.963
	[Land tenure=Leasehold]	3.517	1.318	7.119	1	**.008**	.933	6.100
	[Land tenure=Rented]	0[a]	.	.	0	.	.	.
	[**Do you farm?** Yes]	-2.867	.860	11.119	1	**.001**	-4.552	-1.182
	[Do you farm? No]	0[a]	.	.	0	.	.	.
	[**Source of income**=Farming]	.979	1.346	.529	1	.467	-1.659	3.616
	[Formal employment]	-1.331	1.332	.998	1	.318	-3.941	1.280
	[Informal employment]	.936	1.454	.415	1	.520	-1.913	3.786
	[Business]	0[a]	.	.	0	.	.	.
Chi ^{2}	Sig.000							
Pseudo R^2		Cox and Snell .272,						
		Nagelkerke .329						

Link function: Logit.

Table 7: Ordinal regression model predicting how reliability and availability of infrastructure predict overall infrastructure satisfaction in Kivulini schemes

Parameter Estimates								
							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Location	[Roads not available]	-.665	.829	.644	1	.422	-2.290	.960
	[Roads Available]	0[a]	.	.	0	.	.	.
	[Schools not available]	-.588	1.285	.210	1	.647	-3.107	1.930
	[Schools available]	0[a]	.	.	0	.	.	.
	[Health facility not available]	-1.750	.493	12.593	1	**.000**	-2.716	-.783
	[Health facility available]	0[a]	.	.	0	.	.	.
	[Electricity not available]	-.842	.727	1.342	1	.247	-2.267	.583
	[Electricity available]	0[a]	.	.	0	.	.	.
	[Religious facility not available]	**-2.867**	**.976**	8.633	1	**.003**	-4.779	-.954
	[Religious facility available]	0[a]	.	.	0	.	.	.
	[Unreliable water]	-.600	.730	.677	1	.411	-2.031	.830
	[Reliable water]	0[a]	.	.	0	.	.	.
	[Unreliable roads]	-1.908	.746	6.549	1	**.010**	-3.369	-.447
	[Reliable roads]	0[a]	.	.	0	.	.	.
	[Unreliable Electricity]	-.849	.677	1.573	1	.210	-2.175	.477
	[Reliable Electricity]	0[a]	.	.	0	.	.	.
	[Unreliable Schools]	-.132	1.488	.008	1	.929	-3.049	2.785
	[Reliable Schools]	0[a]	.	.	0	.	.	.
	[Unreliable health]	.355	.468	.577	1	.448	-.562	1.273
	[Reliable Health facility]	0[a]	.	.	0	.	.	.
Link function: Logit.								
Chi [2]	0.000							
Pseudo R^2	Cox and Snell 0.431	Nagelkerke .520						

Conclusion

Settlement schemes in Kenya were introduced as a strategy to promote agricultural development and improve the quality of life of settlers. This paper assessed infrastructure provision in Kivulini settlement schemes, the findings show that only a few amenities have been provided in the schemes, with other facilities having not been developed due to missing in the development plan and inadequate funds. Several challenges have affected infrastructure provision in the settlement schemes, such as lack of essential social infrastructure, poor road conditions that limit accessibility and economic productivity, inadequate funding, and weak institutional support. These challenges undermine service accessibility, restrict livelihood opportunities, and negatively affect settlers' overall quality of life. The paper also assessed settlers' satisfaction with infrastructure; they were satisfied with available facilities and dissatisfied with those lacking. The factors that influence satisfaction with infrastructure are age, marital status, education level, land tenure, and farming engagement. The availability of health and religious facilities, as well as reliable roads, was a significant predictor of satisfaction with infrastructure. Improving both the socioeconomic conditions of settlers and the availability and reliability of necessary infrastructure is critical to enhancing satisfaction with infrastructure and overall quality of life within settlement schemes.

Despite the long-standing role of settlement schemes in rural development, persistent infrastructure deficits continue to undermine their success, which undermines development in rural areas and the livelihood improvement of settlers. Planners should ensure that new settlement schemes have adequate infrastructure development plots and maintenance plans. Infrastructure provision should not be treated as a one-time project but as a continuous program. This paper recommends that planners should ensure that new settlement schemes have a clear, funded infrastructure development and maintenance plan before land is allocated to settlers. The national and county government should prioritize the construction of adequate ECDs, primary and secondary schools, health facilities, and markets within the settlement schemes to improve accessibility and meet planning standards. Roads within the settlement schemes should be upgraded and maintained, to ensure reliability especially during the rainy season. The limitation of this study is that it was conducted on conventional schemes in Molo which is considered agriculture high potential area, hence the findings of this research may not be directly applicable to all settlement schemes. similar studies can be conducted across the various regions and types of schemes to have widely applicable results.

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